

Technology Opportunity

MIRIAD, Applications for Computer Assisted Engineering/Design (CAE/D)

The National Aeronautics and Space Administration (NASA) seeks to transfer computer software technology that enables the controlled simulation of design processes in a self-contained, user friendly computer application.

Potential Commercial Uses

- Applications can be created to simulate and model complex design processes involving many interlocked and changing variables.
- Applications can help verify what effect a change in one, or several, of the variables will have on final design.

Benefits

- Greatly reduces time and cost involved with designing and engineering complex processes
- Simulates design changes and their effects on a desktop personal computer
- Performs simulations before the actual manufacturing process takes place
- Eliminates costly manufacturing mistakes

The Technology

The Module Integrator and Rule-based Intelligent Analytic Database (MIRIAD) approach separates the Computer Assisted Engineering (CAE) tool into the following three distinct units:

- a modern graphical user interface (GUI) to present information
- a data dictionary interpreter (DDI) to coordinate analysis
- a database for storing system designs and analysis results

The user interface is externally programmable through ASCII data files, which contain the location and type of information to be displayed on the

screen. New GUI's can be created using Microsoft Visual Basic and/or Excel. This approach provides great flexibility in tailoring the look and feel of the code to individual user needs. The DDI coordinates the analysis. It provides data requested by the user interface and ensures that it is up to date with respect to all of the data on which it depends. Database files are used by MIRIAD to store design specifications for a system and the results of analyzing the system. Data is entered into a MIRIAD database by being keyed in directly (by a user), by conversion of an existing database, or by being derived within MIRIAD from other pieces of data (e.g., by a calculation model).

MIRIAD applications have utilities for viewing data, XY line plots, contour plots, and three-dimensional (3-D) plots of contour data. In addition, a Monte Carlo facility is provided to allow statistical assessments (including uncertainties) in models or data.

One of the most important design features of MIRIAD is its ability to present information that is up to date reflecting the current state of the system as defined by the user. Any time a piece of data is entered (or modified) in a database, MIRIAD places a time stamp on the data. Before any derived data value is presented, MIRIAD uses the time stamps to determine whether or not the desired data is up to date.

Equally important is MIRIAD's ability to perform ad hoc parametric studies; selecting an independent variable (or variables) to iterate and monitoring the resulting changes in a selected dependent variable (or variables). Virtually any variable displayed in MIRIAD can be selected by the user for inclusion in a parametric study. The tabulated results of a parametric study may be viewed simply as numeric values, or the results can be fed to encapsulated plotting routines for graphical display as described above.



Options for Commercialization

One of NASA's missions is to commercialize its technology. The NASA Lewis Research Center's aim is to commercialize the MIRIAD technology described herein. Aerospace industries such as TRW are already using MIRIAD technology to gain a competitive edge by creating applications that simulate their design processes. Any company wishing to license the MIRIAD technology may do so provided it has a sound business plan with a high potential for success.

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Key Words

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